



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/579,340	05/25/2000	Takeshi Nogami	D414	7243

22898 7590 06/18/2003

THE LAW OFFICES OF MIKIO ISHIMARU  
1110 SUNNYVALE-SARATOGA ROAD  
SUITE A1  
SUNNYVALE, CA 94087

EXAMINER

TRINH, HOA B

ART UNIT	PAPER NUMBER
----------	--------------

2814

DATE MAILED: 06/18/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/579,340

Applicant(s)

NOGAMI, TAKESHI

Examiner

Vikki H Trinh

Art Unit

2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 03 March 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Response to Arguments***

1. In view of the appeal brief filed on 03/03/03, PROSECUTION IS HEREBY REOPENED. The following procedure is set forth below.

To avoid abandonment of the application, appellant must exercise one of the following two options:

- (1) file a reply under 37 CFR 1.111 (if this Office action is non-final) or a reply under 37 CFR 1.113 (if this Office action is final); or,
- (2) request reinstatement of the appeal.

If reinstatement of the appeal is requested, such request must be accompanied by a supplemental appeal brief, but no new amendments, affidavits (37 CFR 1.130, 1.131 or 1.132) or other evidence are permitted. See 37 CFR 1.193(b)(2).

### **Claim Rejections - 35 USC § 103**

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Art Unit: 2814

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. Claims 1-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over admitted prior art (figures 1A-1C and Specification, prior art discussion, pages 1-7) in view of Wang et al. (5629237).

Admitted Prior Art (APA), (figures 1A-1C) and pages 1-7 of the specification, discloses an integrated circuit chip (100) having a substrate, a semiconductor device over the substrate, a dielectric layer formed over the substrate and the semiconductor device, wherein the dielectric layer having a channel opening and a via (106) provided therein. The via has an entrant angle formed on a rim of the channel (104) opening to a rim of the via and a horizontal bottom of the channel opening of certain degrees whereby the channel opening forms a collimator for the via and a depth and a cross sectional area of the channel opening are determined by the via entrant angle, a seed layer (126) lining the channel opening and the via, and a conductive layer damascened into the seed layer and the dielectric layer whereby the conductive layer (128) in the channel opening is operatively connected by the conductive layer in the via to the semiconductor device without voids. However, the Admitted Prior Art, (figures 1A-1C) and pages 1-7 of the specification, does not explicitly teach a specified range for the entrant angle of greater than 69 degrees.

Wang et al. (5629237) teaches a via hole having an entrant angle of less than 90 degrees. Thus, the disclosed perimeter of the entrant angle in Wang et al. includes an overlapping range (e.g. 69-90 degrees) which meets the present invention's claims, in particular claims 1 and 11. See column 1, line 43, and the abstract.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the invention of the APA with an entrant angle of greater than 69 degrees, as taught by Wang et al. (5629237), thereby forming a wall structure that would

Art Unit: 2814

block any misaligned particles into the via which results in a reduction of void formation when filling the via hole with metal material. See column 1, lines 25-30.

Also, it would have been an obvious to an artisan due to manufacturing constraints and ascertainable by routine experimentation and optimization to form a number of angle ranges between 0 and 90 degrees because applicant has not disclosed that this limitation is for a particular unobvious purpose, produces an unexpected result, or is otherwise critical, and it appears prima facie obvious that the process would possess utility using various range for the entrant angles. Furthermore, it is well established that the mere repetition or duplication of a prior art process or means to accomplish an expected additive function or result is prima facie obvious absent a disclosure that the process is for a particular unobvious purpose, produces an unexpected result, or is otherwise critical. See, for example, *In re Ockert*, 114 USPQ 330 (CCPA 1957); *In re Schuelke*, 96 USPQ 421 (CCPA 1953); *In re Hertrich*, 73 USPQ 442 (CCPA 1947); *Long Mfg. N.C., Inc. v. Condec Corp.*, 223 USPQ 1213 (DC ENC 1984); *St. Regis Paper Company v. Bemis Company, Inc.*, 193 USPQ 8 (CA 7 1977); *Hofschneider Corp. v. Lane et al.*, doing business as Lane and Co., 71 USPQ 126 (DC WNY 1946).

With respect to the collimator feature, the collimator is formed when there exist an entrant angle and a channel.

With respect to applicant's remarks on page 3, last paragraph, applicant began by characterizing to the examiner cited case laws as "obsolete standard" for obviousness. Applicant is reminded that case law is authoritative unless the court overrules it. The court in *In re Sang-Su Lee* reversed the board for failing to draw conclusions based upon reasoning supported by evidence of record. The *Lee* court citing *In Re Fritch* stated that an examiner may satisfy the

Art Unit: 2814

burden of showing obviousness by showing an objective teaching or that knowledge generally available would lead one to combine the teachings.

In this case, the motivation to combine the two references is suggested in Wang et al. (5629237), column 1, line 43, and the abstract. Wang et al. cures the deficiency in the APA by providing the overlapping range of the entrant angle to meet the present claim's limitation, which provides the result as the present invention. (See also column 1, lines 25-30.) Therefore, the disclosed perimeter of the entrant angle in Wang et al. satisfies the specified range of the present invention's claims, in particular claims 1 and 11.

Issue 2 is moot since Wang articulates the motivation.

Issue 3 : MPEP 2131.03 states that if a claimed range overlaps a prior art range, the claim is anticipated. Since Wang discloses 0-90 degrees, applicants' range of 69-90 is overlapped and therefore anticipated.

### *Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Vikki H Trinh whose telephone number is 703-308-8238. The examiner can normally be reached on Mon.-Tues, Thurs.-Fri..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on 703-306-2794. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-77224 for regular communications and 703-308-7724 for After Final communications.

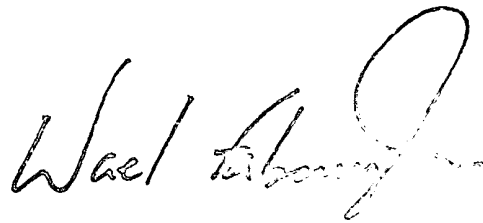
Application/Control Number: 09/579,340

Page 7

Art Unit: 2814

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

Vikki Trinh  
June 16, 2003

A handwritten signature in black ink, appearing to read "Wael Labadie". The signature is fluid and cursive, with a large loop at the end.

SUPERVICORY PRIMARY CENTER  
TECHNOLOGY CENTER 2003